

Date: Wednesday, 17/09/2008 2:41:04 PM
 User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : 212/205 HIGH FED X-TUBE ASSEMBLY
Job Number : 42062	
Estimate Number : 10254	
P.O. Number :	Part Number : D212664101
This Issue : 17/09/2008 S.O. No. :	Drawing Number : D212-664-141 REV C
Prsht Rev. : NC	Project Number : N/A
First Issue : // Type : CROSSTUBES	Drawing Revision : C
Previous Run : 42061	Material :
Written By :	Due Date : 30/09/2008 Qty: 1 Um: Each
Checked & Approved By : JLD 08.9.17	
Comment : Est Rev:E 04.02.16 Reformat KJ/DS	
Est Rev:F 06-03-29 Remove Comments on Park List JLM	
Est Rev:G 07-04-30 As per Rev C JLM	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
1.0	DC	DOCUMENT CONTROL



JLD 08.9.24



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-101 CHG003

S 08/10/18

2.0	PACKAGING 1	PACKAGING RESOURCE #1
-----	-------------	-----------------------



Comment: PACKAGING RESOURCE #1

3.0	D212664101TRN	Crosstube Turning Detail
-----	---------------	--------------------------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch B42060

DP 8-9-18



4.0	BENDING	BENDING MACHINE - SKIDTUBES
-----	---------	-----------------------------



Comment: BENDING MACHINE

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio FT015

DP 8-9-18

5.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-----	------	------------------------------



Comment: DIMENSIONAL CHECK OF X-TUBES

J 08.09.19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 17/09/2008 2:41:04 PM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 42062

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

4-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

ET 08-09-19

AWM 8-9-22

ET 08-09-19

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



8-9-22 AWM



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

8.0

QC5

INSPECT WORK TO CURRENT STEP



08-10-09 (1)



Comment: INSPECT WORK TO CURRENT STEP

9.0

OUTSIDE SERV.11

OUTSIDE SERVICE -CROSSTUBES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: 7346

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

C 208110109 (1)

10.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

Respect 9 C

11.0

QC5

INSPECT WORK TO CURRENT STEP



ml 081009

(1)



Comment: Inspect for damage & ensure results are as per Dwg D212-664-141

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Date: Wednesday, 17/09/2008 2:41:04 PM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 42062

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ml 08 10 09 (1)

13.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

208.10.10

14.0

D28931

2.75 Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2893-1

Support

40781

ml 08 10 10

15.0

D3595063450

RUBBER CUSHION



Comment: Qty.: 4.2000 Each(s)/Unit Total : 4.2000 Each(s)

Rubber Cushion (per sq ft)

.630" X 4.5" 4PCS

Batch:

40221

ml 08 10 10

16.0

MS2192025

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-25

Clamp

108976

ml 08 10 10

17.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond

Batch: 108966

ml 08 10 10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 17/09/2008 2:41:04 PM
User: Julie Lecocq

Process Sheet

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Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 42062

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

Expiry Date: 10/2009

Time: 8:20am

M 08 10 10 (1)

3-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

M 08 10 14 (1)

18.0

QC5

INSPECT WORK TO CURRENT STEP



08.10.14 (1)

Comment: INSPECT WORK TO CURRENT STEP

19.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

20.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

PLACARD

Batch: 41552

21.0

AN635A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: 109282

22.0

AN636A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: 1108765

23.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total: 18.0000 Each(s)

Washer

Batch: 108521

24.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total: 6.0000 Each(s)

Nut

Batch: 1108183

PC 8/10/15 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 42062

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

508/10/15

26.0

PACKAGING 1

PACKAGING RESOURCE #1



POSITIVE RECALL



8/10/15 SP

Comment: HAND FINISHING RESOURCE #1

EFFECTIVE

08/02 AUTH U

hwd

Identify and pack for shipping as per PPP D212-664-101

RELEASED

U DATE 08/10/15

sell to E2p only

27.0

QC21

FINAL INSPECTION/W/O RELEASE



08/10/16 JF

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



POSITIVE RECALL

EFFECTIVE 08/02 AUTH U

RELEASED U DATE 08/10/15

MF 08-10-16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

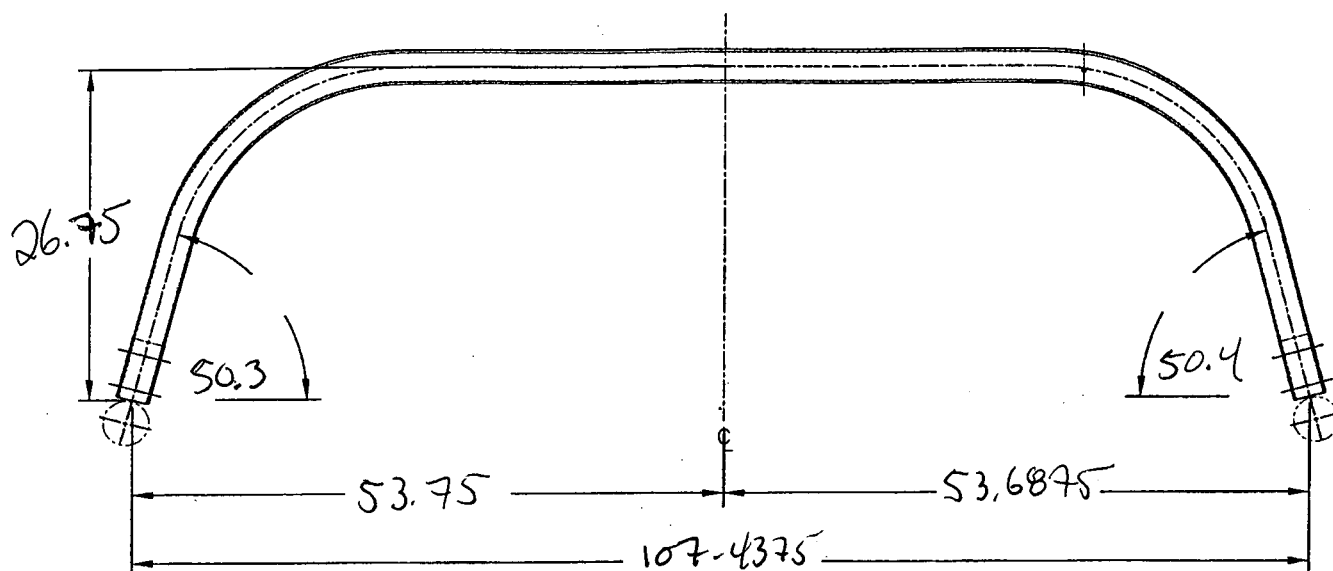
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 42062
Description: Crosstube High Fwd (205/212/412)		Part Number: D212-664-101
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	<i>[Signature]</i>
Date	
	08.09.19.

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM <i>[Signature]</i>	<i>[Signature]</i>



DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED QP	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE XTUBE ASS'Y (205/212/412 HI FWD) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

RELEASED

07.04.24 **[Signature]**

Qty	Part Number	Description
X	D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
1	D6005-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
4	MS21920-25	CLAMP (OR MS21920-26)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.51 ± 0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

NO. 42002
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SIDE COPY

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LIQUID PENETRANT TEST REPORT

P- 09127

PAGE 1 OF 1

TIME AM ☐ PM ☐

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/VO NO.

WORK LOCATION

ACCEPTANCE STD.

REV./DATE

PROJECT

ITEM(S) EXAMINED

JOB DESCRIPTION

PROCEDURE NO. LT-XXXX REV./DATE

TECHNIQUE NO. LT-XXXX-XXX REV./DATE

PART NO.

SCOPE

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND			BLACK LIGHT S/N	<input checked="" type="checkbox"/> OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANT	30 mm	MINIMUM DWELL TIME	30 MIN.	LIGHTING EQUIP. <input checked="" type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER		MINIMUM DRY TIME	>10 MIN.	OTHER	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
DEVELOPER		MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	8171
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY N/A		CAL DUE DATE Jan 12/09

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS-

ITEM	COMMENTS	ACCEPT	REJECT
41394	ACCEPTABLE		
41393	ACCEPTABLE		
42296	ACCEPTABLE		
42297	ACCEPTABLE		
42061	ACCEPTABLE		
42062	ACCEPTABLE		

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

CGSB LEVEL

CGSB REG. NO.

1ST TECHNICIAN

SNT LEVEL

10560

CGSB LEVEL

CGSB REG. NO.

2ND TECHNICIAN

SNT LEVEL

DTR #

REPORT

REVIEWED BY:

NAME

INITIALS

WHITE - CLIENT COPY

CANARY - OFFICE COPY

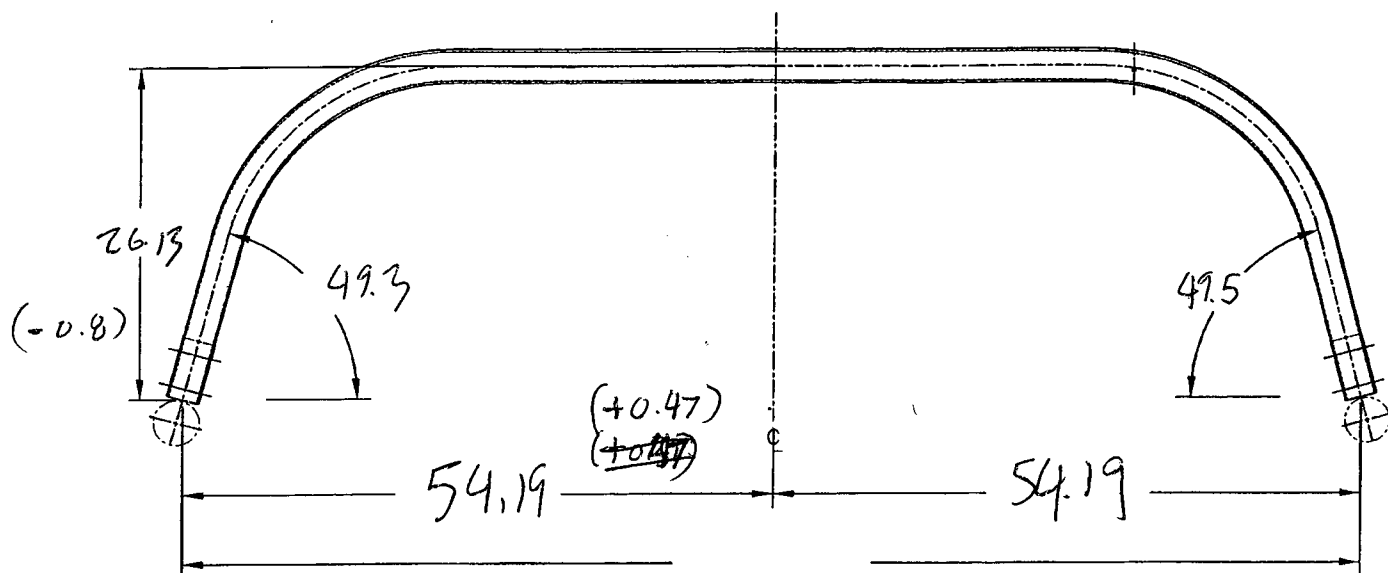
PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005

DART AEROSPACE LTD	Work Order:	42062
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1

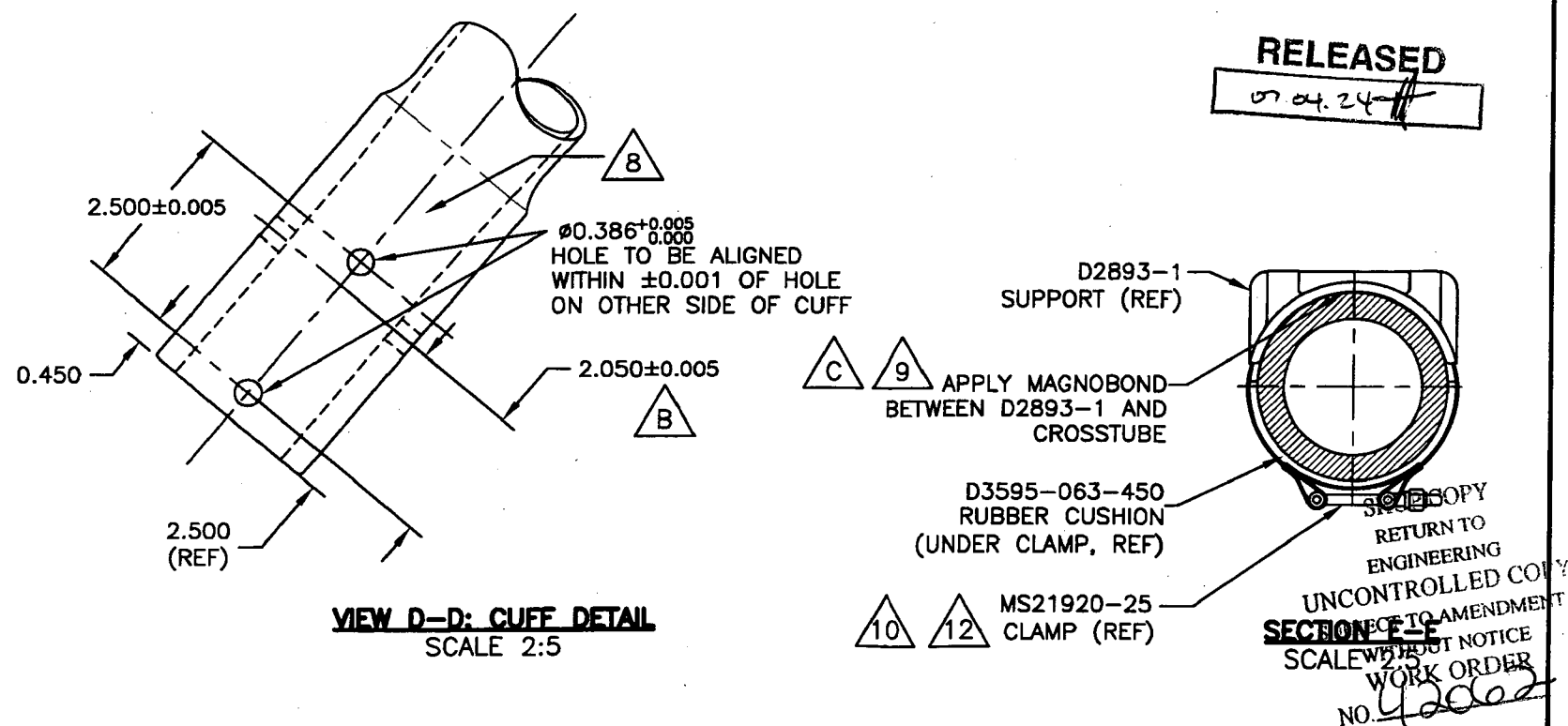
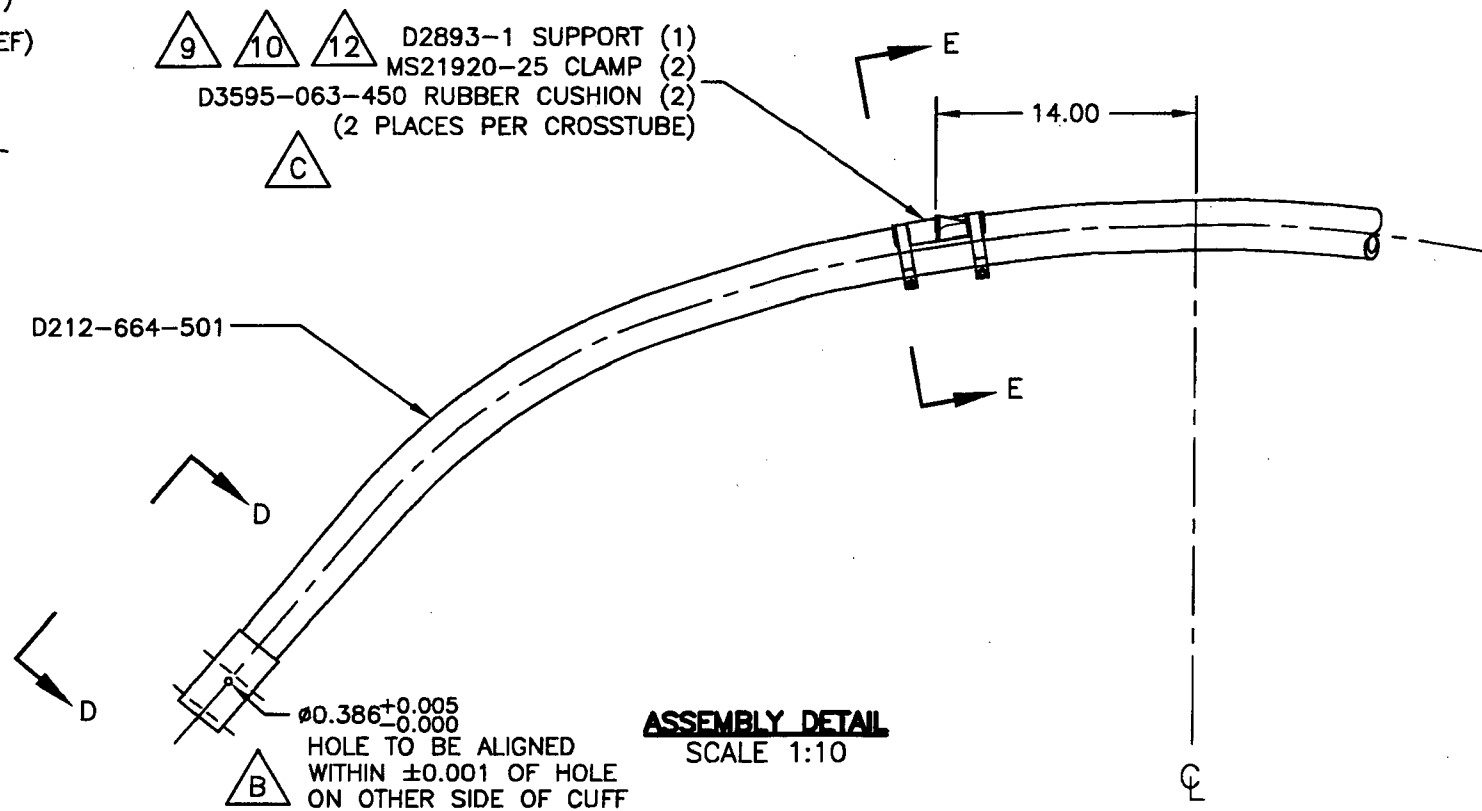
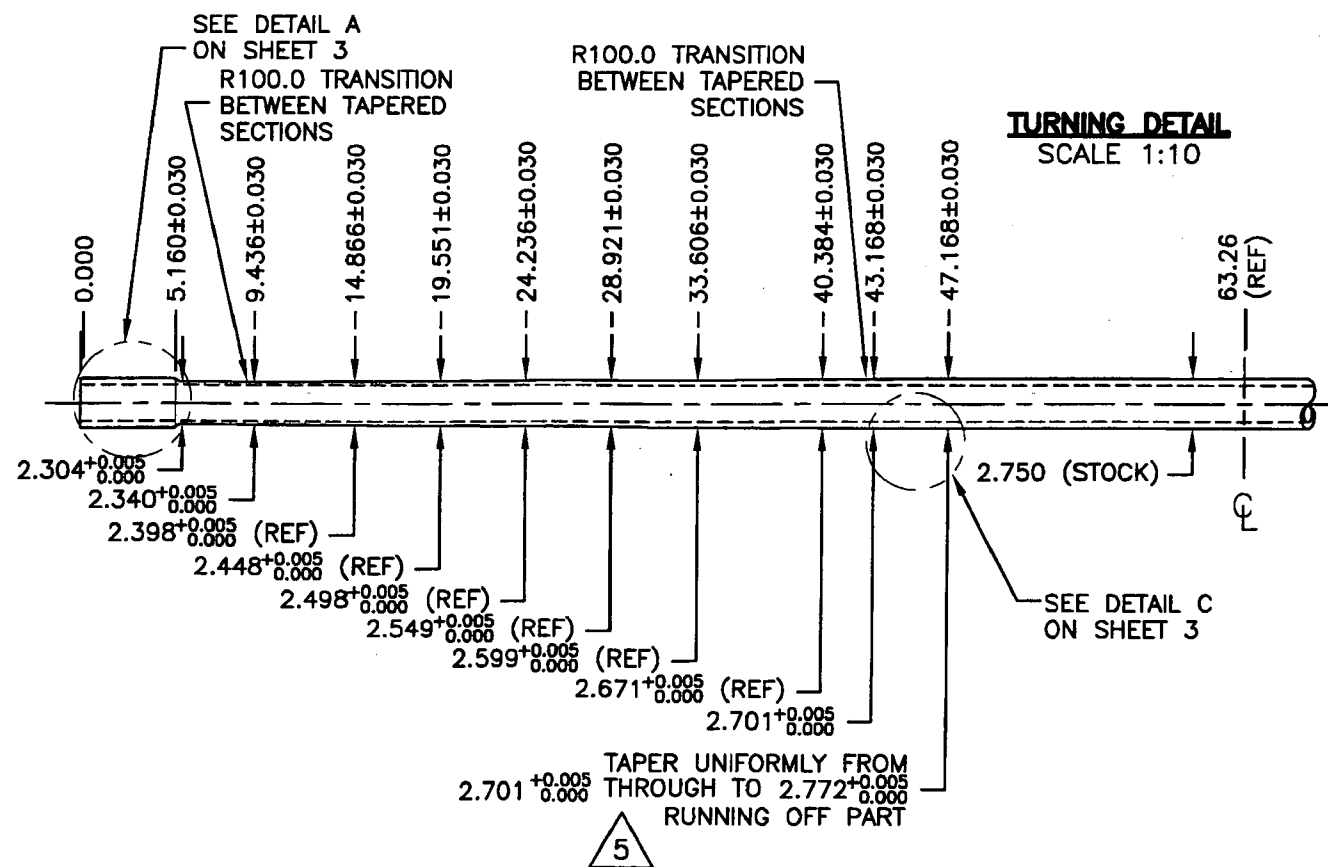
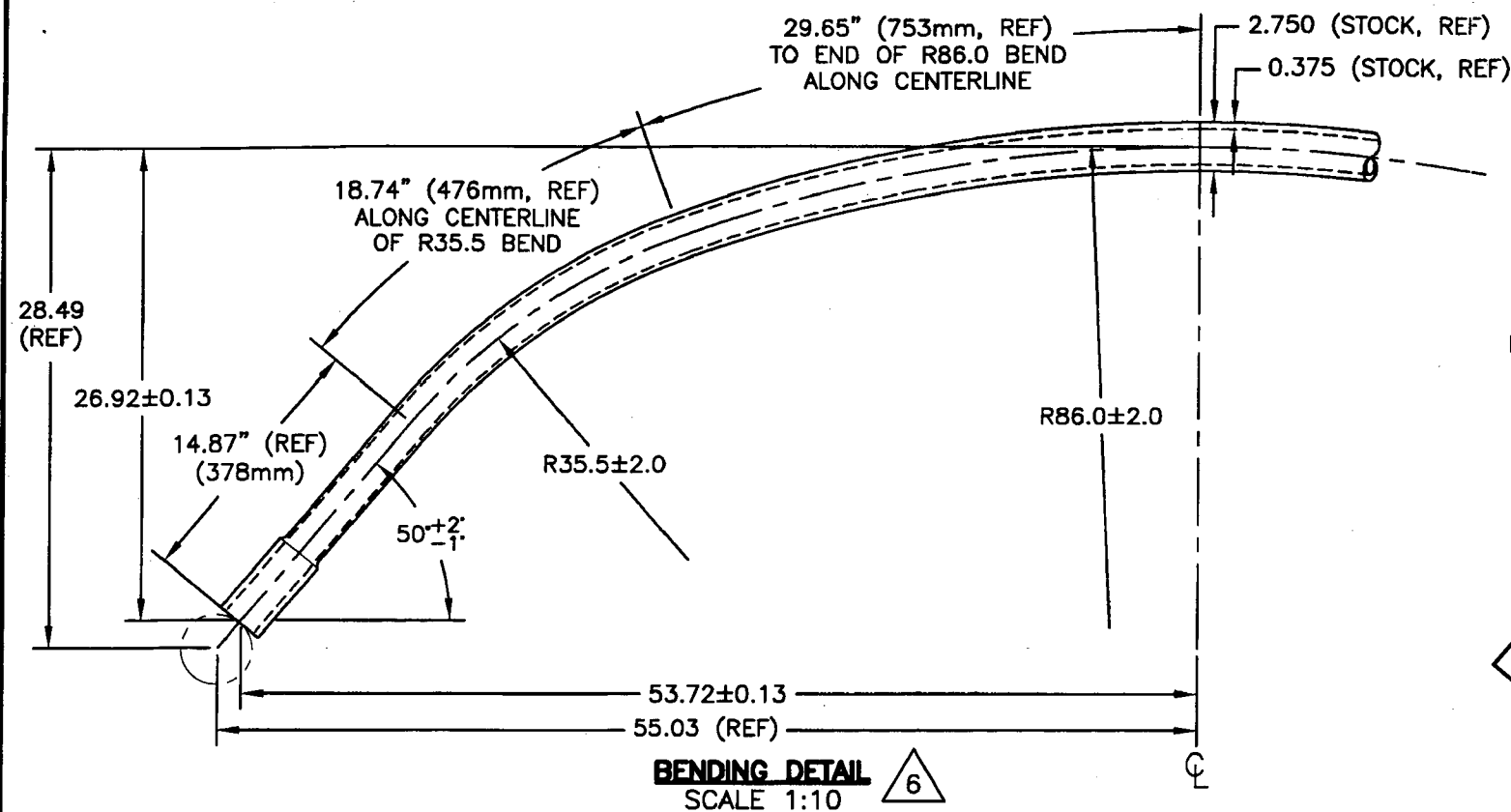
Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	CP
Date	08.10.14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	



RELEASED

07.04.24

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DESIGN

PH

DRAWN BY

PH

DART

DART AEROSPACE LTD.

HAWKESBURY, ONTARIO, CANADA

CHECKED

99

APPROVED

PH

DRAWING NO.

REV. C

DATE

07.03.08

TITLE

D212-664-141

SHEET 2 OF 3

XTUBE ASS'Y (205/212/412 HI FWD) 1:10

SECTION E-E

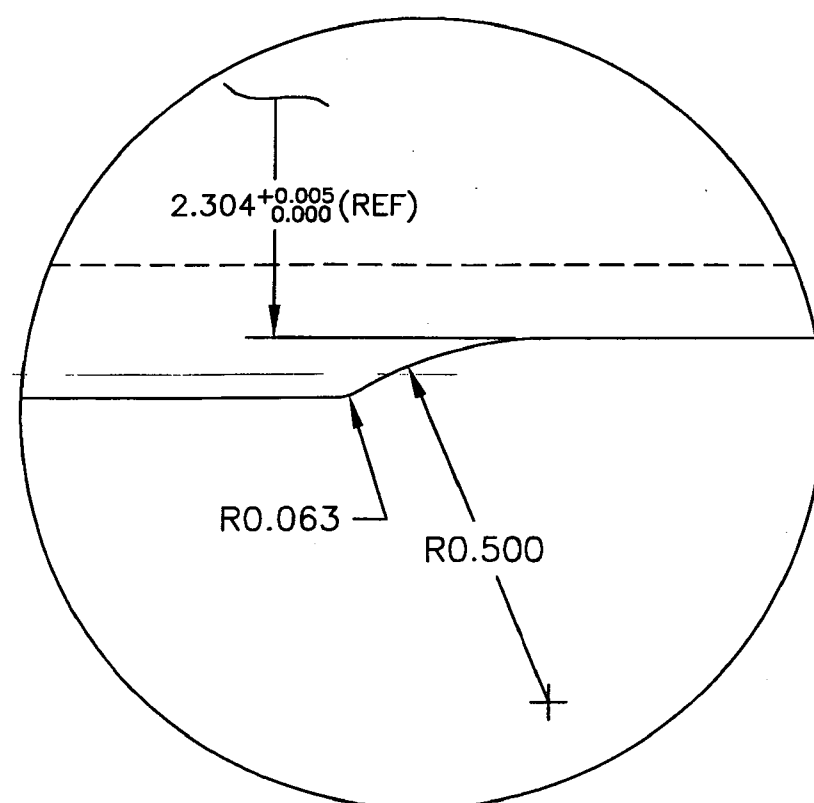
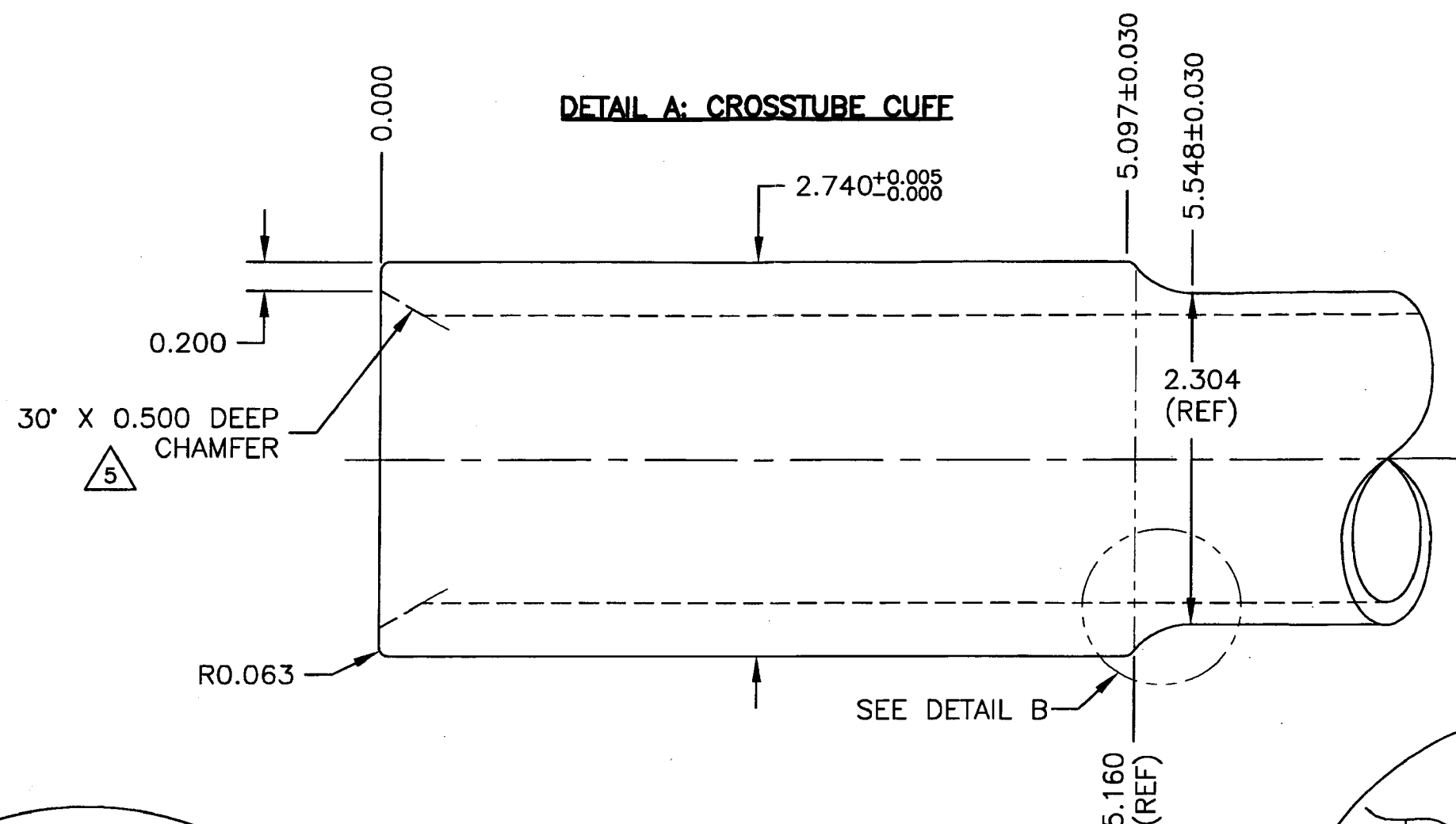
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WORK ORDER

NO. 42002

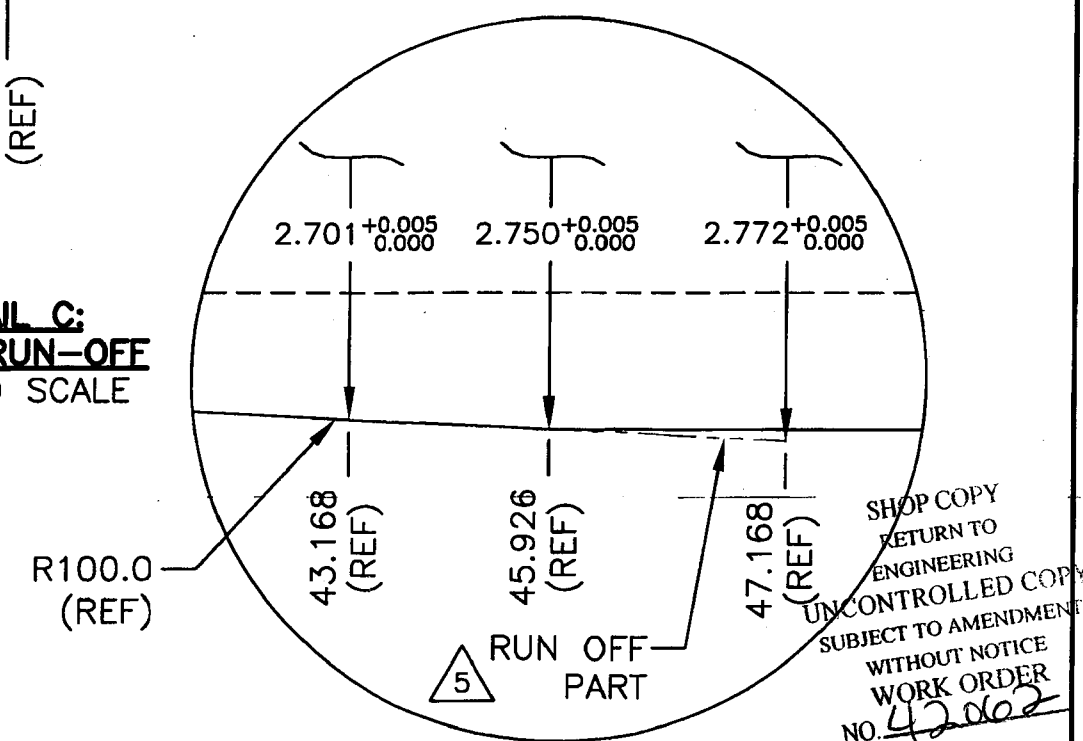
RELEASED
 07.04.24 CP
 PER ELN 887

DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
 TRANSITION
 SCALE 4:1**

**DETAIL C:
 TAPER RUN-OFF
 NOT TO SCALE**



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 DART AEROSPACE LTD.

DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAMKESBURY, ONTARIO, CANADA
CHECKED J	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 3 OF 3
DATE 07.03.08	TITLE XTUBE ASS'Y (205/212/412 HI FWD)	SCALE 1:1	

